AOT1100L/AOB1100L

100V N-Channel Rugged Planar MOSFET

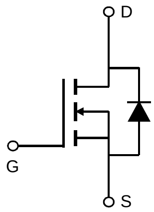
General Description

The AOT1100L/AOB1100L uses a robust technology that is designed to provide efficient and reliable power conversion even in the most demanding applications, including motor control. With low $R_{DS(ON)}$ and excellent thermal capability this device is appropriate for high current switching and can endure adverse operating conditions.This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

Features

V_{DS}	100V
I_D (at V_{GS}=10V)	130A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 12mΩ

Green Product



Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [G]	T_C=25℃	I_D	130	A
	T_C=100℃		92	
Pulsed Drain Current [C]		I_{DM}	208	
Continuous Drain Current	T_A=25℃	I_{DSM}	8	A
	T_A=70℃		6	
Avalanche Current [C]		I_{AS}	122	A
Avalanche energy L=0.1mH [C]		E_{AS}	744	mJ
Power Dissipation [B]	T_C=25℃	P_D	500	W
	T_C=100℃		250	
Power Dissipation [A]	T_A=25℃	P_{DSM}	2.1	W
	T_A=70℃		1.3	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	12	15	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		48	60	℃/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	0.22	0.3	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250µA, V_{GS}=0V	100			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V, V_{GS}=0V			1	µA
		T_J=55℃			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250µA	2.6	3.2	3.8	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	208			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A TO220		10	12	mΩ
		T_J=125℃		19	22	
		V_{GS}=10V, I_D=20A TO263		9.7	11.7	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		53		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.69	1	V
I_S	Maximum Body-Diode Continuous Current[G]				130	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		4833		pF
C_{oss}	Output Capacitance			721		pF
C_{rss}	Reverse Transfer Capacitance			35		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.5	1.1	1.7	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=50V, I_D=20A		82	100	nC
Q_{gs}	Gate Source Charge			23		nC
Q_{gd}	Gate Drain Charge			19		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=50V, R_L=2.5Ω, R_{GEN}=3Ω		21		ns
t_r	Turn-On Rise Time			22		ns
$t_{D(off)}$	Turn-Off DelayTime			50		ns
t_f	Turn-Off Fall Time			4.5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=500A/µs		64		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=500A/µs		880		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The Power dissipation P_{DSM} is based on R $_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.
B. The power dissipation P_D is based on $T_{J(MAX)}$=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=175°C. Ratings are based on low frequency and duty cycles to keep initial T_J =25°C. Maximum UIS current limited by test equipment.
D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=175°C. The SOA curve provides a single pulse rating.
G. The maximum current limited by package.
H. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

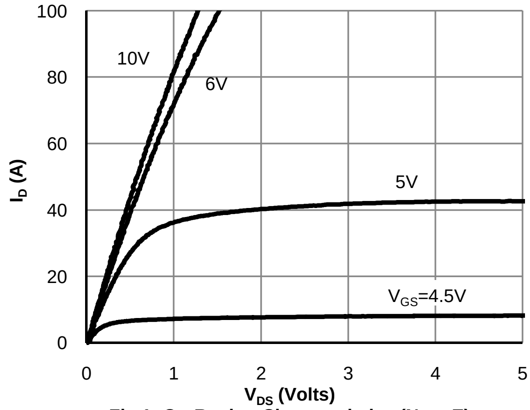


Fig 1: On-Region Characteristics (Note E)

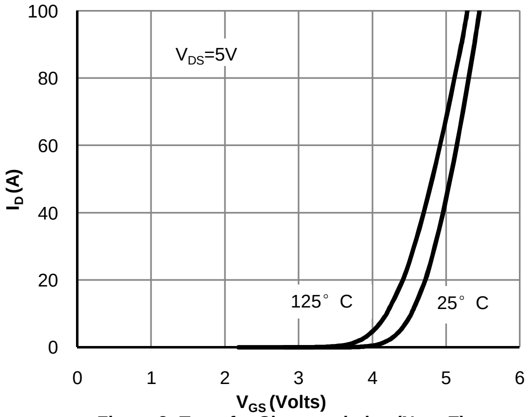


Figure 2: Transfer Characteristics (Note E)

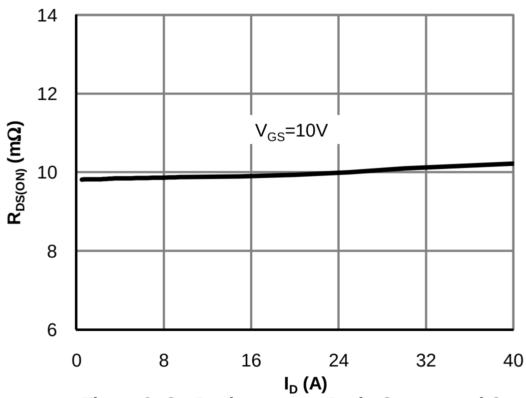


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

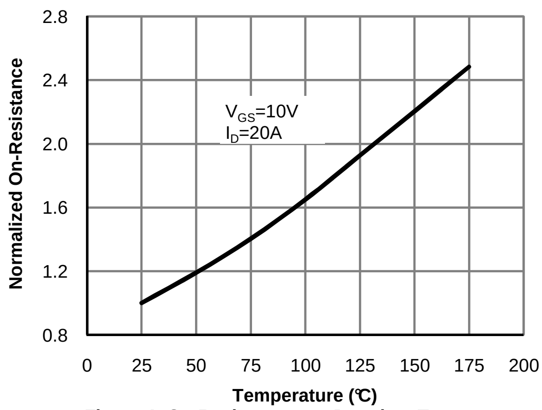


Figure 4: On-Resistance vs. Junction Temperature (Note E)

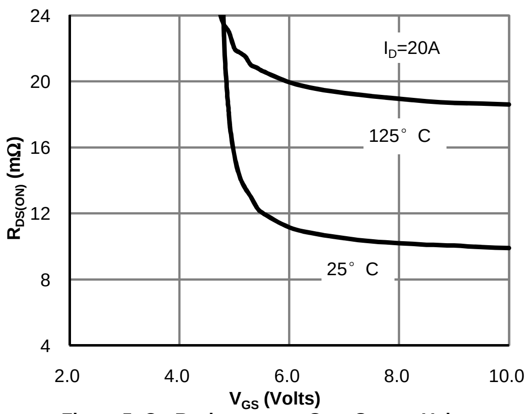


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

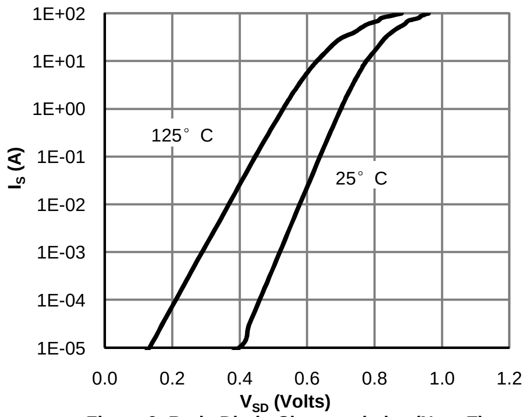


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

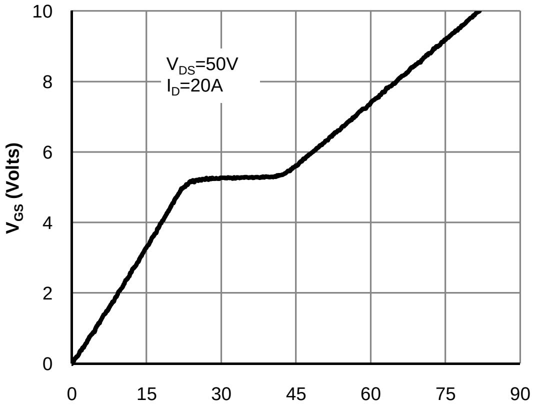


Figure 7: Gate-Charge Characteristics

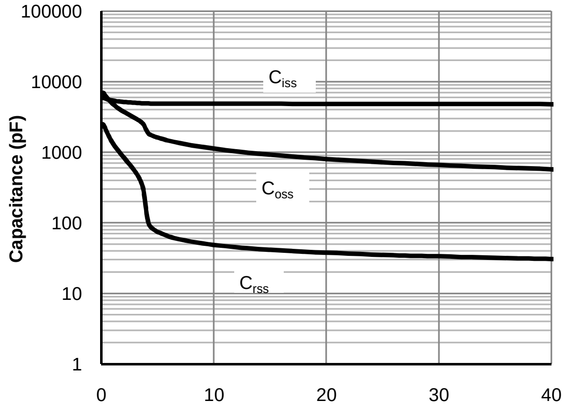


Figure 8: Capacitance Characteristics

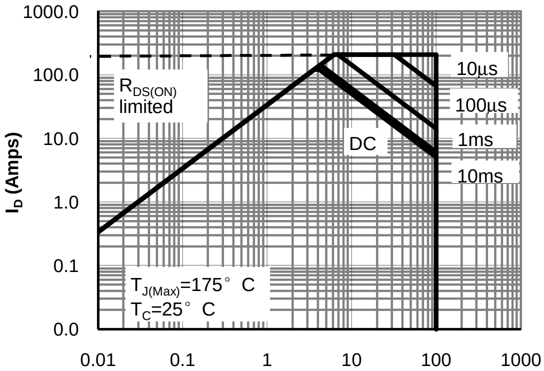


Figure 9: Maximum Forward Biased Safe Operatin Area (Note F)

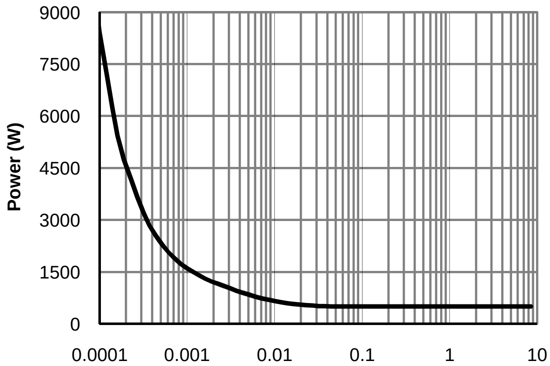


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

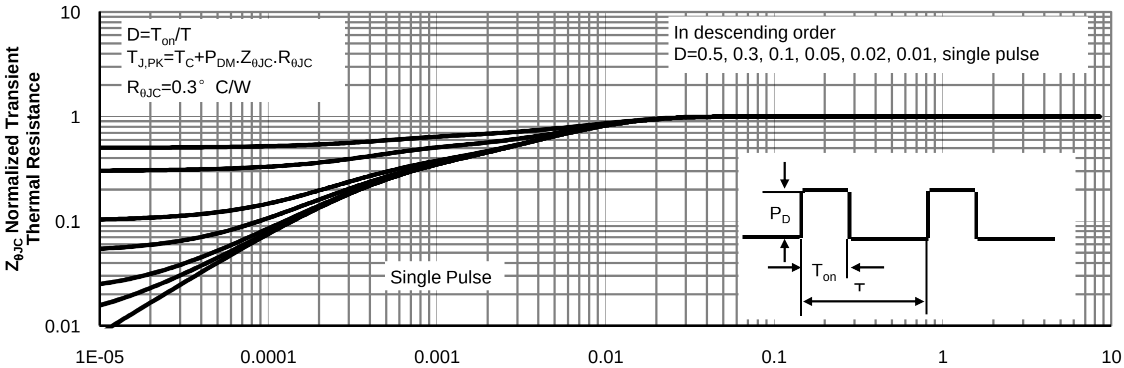


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

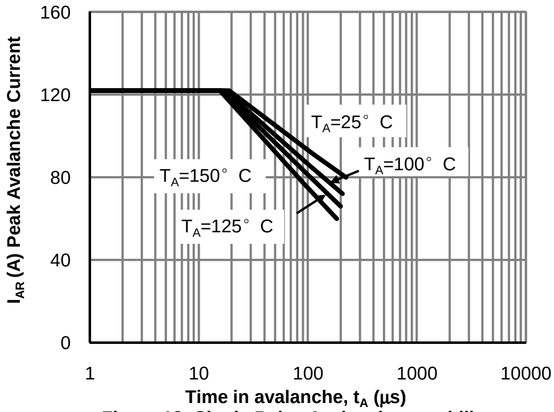


Figure 12: Single Pulse Avalanche capability (Note C)

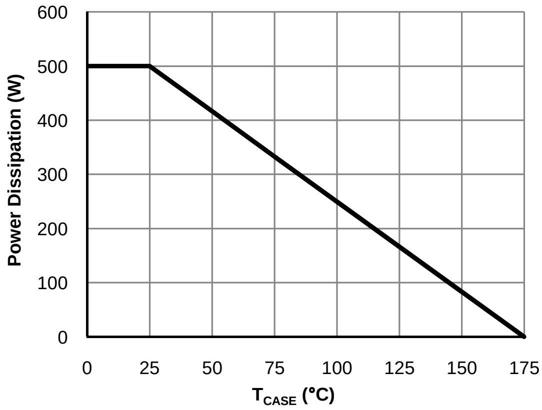


Figure 13: Power De-rating (Note F)

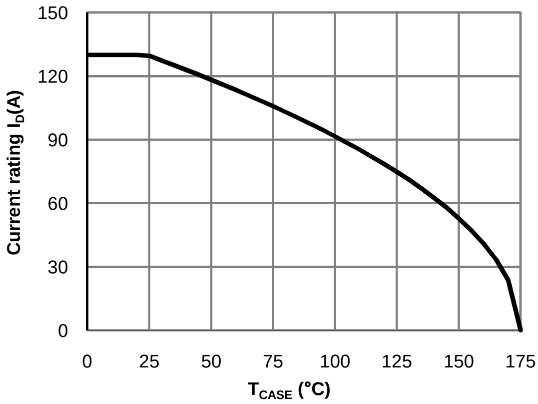


Figure 14: Current De-rating (Note F)

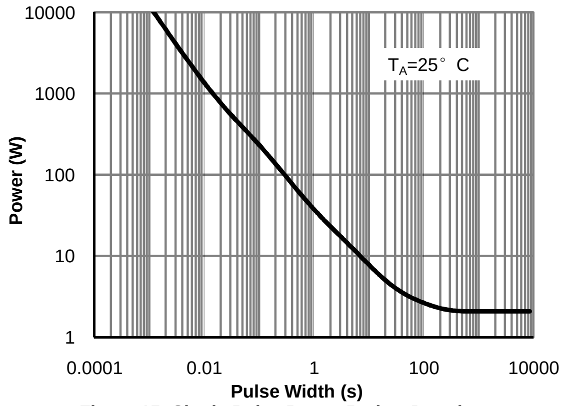


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

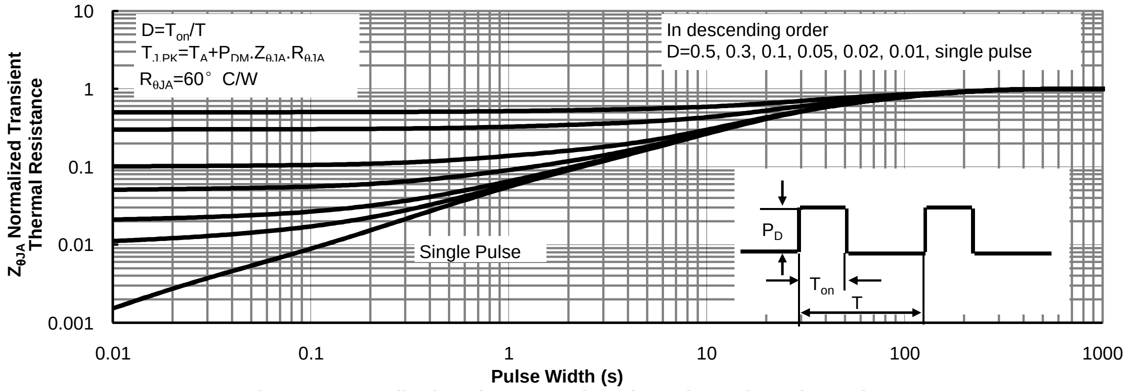
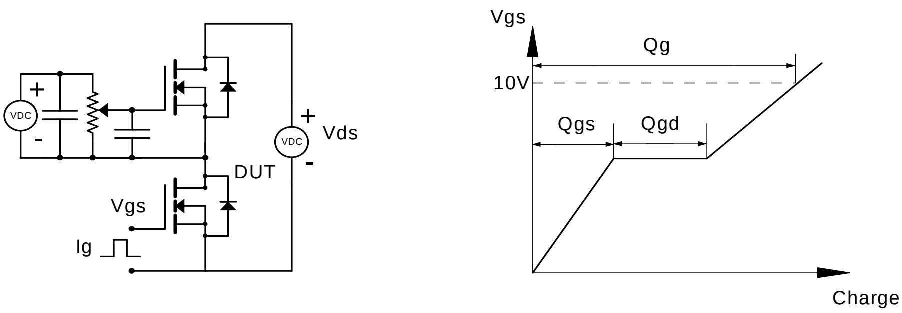
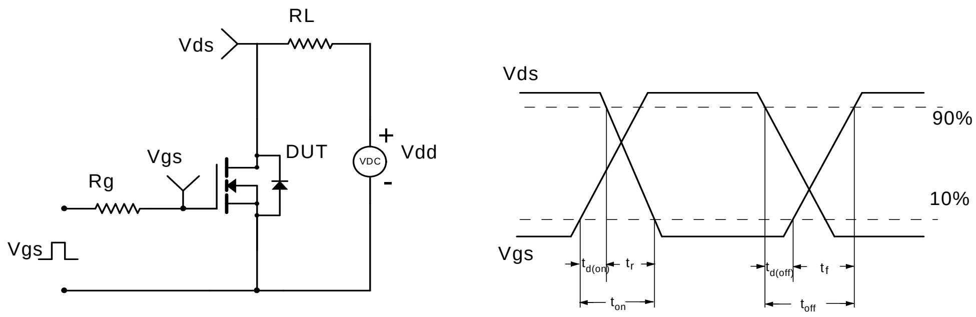


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

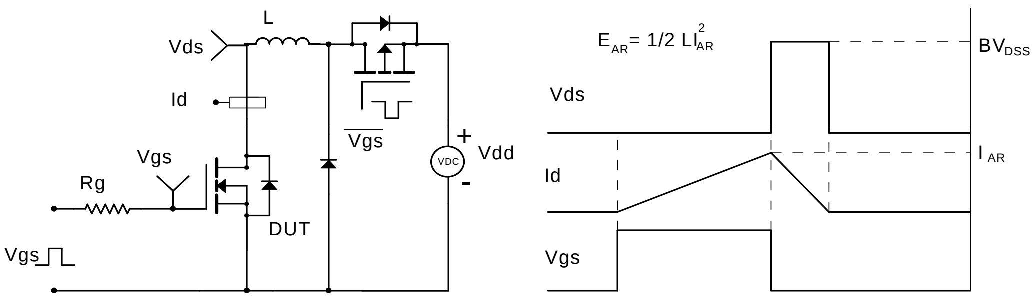
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms